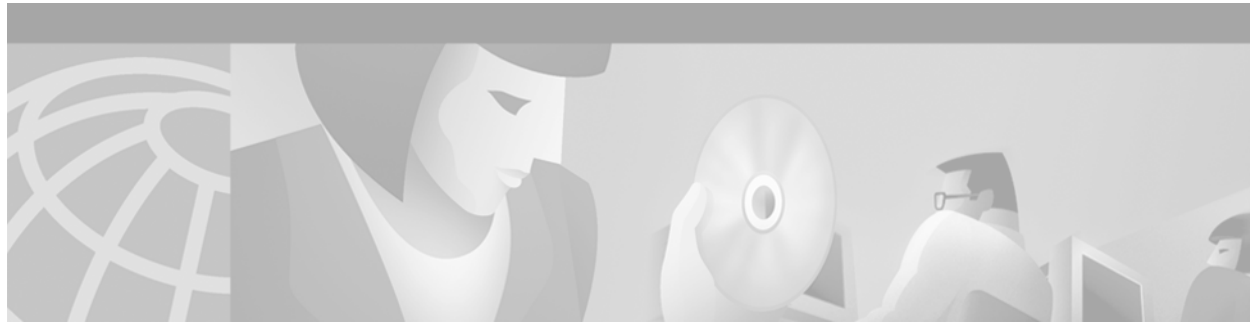




Release Notes for Cisco IOS Release 12.0(7)XV Feature Packs for the Cisco 800 Series Routers

January 24, 2000

These release notes describe the Cisco IOS Release 12.0(7)XV feature packs for Cisco 800 series routers and contain the following topics:

- Introduction, page 1
- System Requirements, page 3
- Installation Notes, page 11
- Related Documentation, page 24
- Service and Support, page 29
- Cisco Connection Online, page 30
- Documentation CD-ROM, page 31

Introduction

List of Terms

The following terms are used throughout this document:

- Feature—Networking functionality command(s) that support networking technology and hardware. For example: Double Authentication, IP Multicast over Token Ring, Voice Over IP, and PPP over ATM.
- Feature pack—A small box containing software images, applications and documentation on CD-ROMs, and hardcopy documentation. Feature packs provide software upgrades for many of the Cisco hardware platforms.



Corporate Headquarters: Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

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- Feature set—A group of features. For example: IP, IP Plus, Enterprise Plus, and IP Sec 56
- Image—Software code containing a Cisco IOS feature set. The image file naming nomenclature, such as c800-y6-mw, c1000-bnsy40-mz, and c2500-g-l, specifies a platform, feature set, and file compression method. For example, c4500-is56i-mz indicates:
 - Platform: (c4500) 4500 platform.
 - Feature set: (is56i) IP Plus IP Sec 56.
 - Compression method: (mz) RAM, zip compressed.

How to Use These Release Notes

The tables in these release notes contain details about the Cisco feature packs. Use these tables to perform the following tasks before loading a software image onto a router:

1. Use Table 1, “Cisco 800 Series Default Memory and Upgrade Options,” for the feature set memory requirements, factory-default memory, and available memory upgrades for your Cisco 800 router.
2. Use Table 3, “Feature Pack Product Numbers Quick-Reference List,” to identify the software image you want to load.
3. Use Table 4, “Cisco 800 Series Routers Feature Packs,” to identify your feature pack and the memory required for your feature set, based on the image you load.
4. Use the tables in the “Feature Set Tables” section on page 6 to identify which features are supported in a feature set image.

Feature Pack Components

The feature pack box typically contains the following items:

- A CD-ROM with the following software:
 - Cisco IOS feature set software images that can include bundled modem firmware.
 - The Router Software Loader (RSL) program (a Windows 95 application) that loads images onto your Cisco 800 series router.
 - Trivial File Transfer Protocol (TFTP) server application (for Windows 95 only).
- Getting Started with the Router Software Loader.



Note If you cannot use the RSL to load images, you can follow the instructions in the “Alternatives to the RSL” section on page 12.

- Release notes (this document).
- Other configuration or command references, if available.
- Software license for using Cisco software in object code form on a single access server or router.
- Documentation CD-ROM that contains all Cisco documentation.

System Requirements

This section describes the following topics:

- Memory Defaults and Upgrade Options, page 3
- Hardware Supported, page 3
- Software Compatibility, page 4
- Determining Your Software Release, page 4
- Updating Your Software Release, page 4
- Product Numbers Quick-Reference List, page 5
- Feature Pack Overview Table, page 5
- Feature Set Tables, page 6

Memory Defaults and Upgrade Options

Table 1 *Cisco 800 Series Default Memory and Upgrade Options*

Memory Type	Cisco 801-804 Defaults	Upgrade Options
Flash memory card	8 MB	4-MB to 8-MB upgrade: MEM800-4U8F 8-MB to 12-MB upgrade: MEM800-8U12F
DRAM	4 MB	4-MB to 8-MB upgrade: MEM800-4U8D 4-MB to 12-MB upgrade: MEM800-4U12D

Hardware Supported

Cisco IOS Release 12.0(7)XV supports the following Cisco 800 series routers:

- Cisco 801
- Cisco 802
- Cisco 803
- Cisco 804



Caution

Cisco IOS Release 12.0(7)XV supports the Cisco 801–804 series routers only.

Table 2 *Supported Interfaces for the Cisco 801–804 Series Routers*

Router	Ethernet Ports	ISDN Ports	Telephone Ports	Console Ports
Cisco 801	One 10BaseT (RJ-45)	ISDN BRI S/T (RJ-45)	–	RJ-45
Cisco 802	One 10BaseT (RJ-45)	ISDN BRI U, integrated Network Termination 1 (NT-1) (RJ-45)	–	RJ-45

Table 2 *Supported Interfaces for the Cisco 801–804 Series Routers (continued)*

Router	Ethernet Ports	ISDN Ports	Telephone Ports	Console Ports
Cisco 803	Four-port 10BaseT (RJ-45) hub	ISDN BRI S/T (RJ-45)	Two (RJ-11)	RJ-45
Cisco 804	Four-port 10BaseT (RJ-45) hub	ISDN BRI U, integrated NT-1 (RJ-45)	Two (RJ-11)	RJ-45

The Cisco 800 series routers provide the following key hardware features:

- Cisco 802 and Cisco 804 routers have an integrated NT-1, which eliminates the need for an external NT-1 in North America.
- Cisco 803 and Cisco 804 routers provide connection to analog telephones, fax machines, or modems, which are connected to telephone services through an Integrated Services Digital Network (ISDN) line.
- Flash memory: Default is 8 MB, expandable to 12 MB.
- Dynamic RAM: Default is 4 MB, expandable to 12 MB.
- ISDN B-channel LEDs are a different color from the other LEDs, which make them easy to distinguish.
- Color-coded ports and cable reduce the chance of cabling errors.
- Routers can be stacked or mounted on a wall.

Software Compatibility

The feature packs described in these release notes contain Cisco IOS Release 12.0(7)XV software images, some images from previous software releases, and the RSL Version 7.3.

Determining Your Software Release

To determine the version of Cisco IOS software running on your Cisco 800 series, log in to the router and enter the **show version EXEC** command:

```
router> show version
Cisco Internetwork Operating System Software
IOS (tm) 800 Software (C800-NSY6-MW), Version 12.0(7)XV, RELEASE SOFTWARE
```

Updating Your Software Release

For information on upgrading to a Cisco IOS Release 12.0 T software release, see the product bulletin *Cisco IOS Software Release 12.0 T Upgrade Paths and Packaging Simplification (#819: 1/99)* on CCO at:

Service and Support: Product Bulletins: Software

Under **Cisco IOS 12.0**, click **Cisco IOS Software Release 12.0 T Upgrade (#819: 1/99)**.

Product Numbers Quick-Reference List

Table 3 Feature Pack Product Numbers Quick-Reference List

Product Number	Feature Pack Description
CD08-BP-12.0.7.XV=	Cisco 800 Series IP IPX Plus Feature Pack 12.0(7)XV
CD08-BHL-12.0.7XV=	Cisco 800 Series IP IPX, FW, Plus IPSec Feature Pack 12.0(7)XV
CD800-1CAPI=	Cisco 800 Series IP Upgrade Feature Pack Release 12.0(7)XV RSL Version 7.3 (CAPI Software one-user license)
CD800-5CAPI=	Cisco 800 Series IP Plus Upgrade Feature Pack Release 12.0(7)X RSL Version 7.3 (CAPI Software five-user license)

Feature Pack Overview Table

Table 4 Cisco 800 Series Routers Feature Packs

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD08-BP-12.0.7.XV=	Cisco 800 Series IP/IPX Plus Feature Pack Release 12.0(7)XV RSL Version 7.3	c800-nsy6-mw	aaa1167	8 MB	4 MB	Cisco 800 Series IP IPX Plus Feature Pack 12.0(7)XV
CD08-BHL-12.0.7XV=	Cisco 800 Series IP/IPX/FW/Plus/IPSec Feature Pack Release 12.0(7)XV RSL Version 7.3	c800-nosy656i-mw	aaa1168	8 MB	8 MB	Cisco 800 Series IP IPX, FW, Plus IPSec Feature Pack 12.0(7)XV
CD800-1CAPI=	Cisco 800 Series IP Feature Pack Release 12.0(7)XV RSL Version 7.3 (CAPI Software one-user license)	c800-y6-mw	aaa1169	8 MB	4 MB	Cisco 800 Series IP Feature Pack 12.0(7)XV(CAPI Software one-user license)
CD800-5CAPI=	Cisco 800 Series IP Plus Feature Pack Release 12.0(7)XV RSL Version 7.3 (CAPI Software five-user license)	c800-y6-mw	aaa1170	8 MB	4 MB	Cisco 800 Series IP Plus Feature Pack 12.0(7)XV(CAPI Software five-user license)

Feature Set Tables

The Cisco IOS software is packaged in feature sets consisting of software images—depending on the platform. Each feature set contains a specific set of Cisco IOS features. Release 12.0(7)XV supports the same feature sets as Release 12.0 T, but Release 12.0(7)XV can include new features supported by the Cisco 800 series.

Table 5 *Feature Sets Supported by the Cisco 800 Series*

Image Names	Feature Set Matrix Term	Software Image	Platforms	In ¹
IP	Basic ²	c800-y6-mw	Cisco 801–804	
IP Plus	Plus ³	c800-sy6-mw	Cisco 801–804	
IP/IPX Plus	Plus	c800-nsy6-mw	Cisco 801–804	
IP/Firewall	Basic	c800-oy6-mw	Cisco 801–804	
IP/Firewall Plus	Plus	c800-osy6-mz	Cisco 801–804	(5)T
IP/FW/Plus/IPSec 56	Plus, IPSec 56 ⁴	c800-osy656i-mw	Cisco 801–804	(5)T
IP/IPX/FW/IPSec 56/Plus	Plus, IPSec 56	c800-nosy656i-mw	Cisco 801–804	(5)T

1. The number in the “In” column indicates the Cisco IOS release when the image was first introduced. For example, (5)T means an image was introduced in Release 12.0(5)T. If a cell in this column is empty, the interface was included in the initial base release.
2. This feature set is offered in the basic feature set.
3. This feature set is offered in the Plus feature set.
4. This feature set is offered in the encryption feature sets, which consist of IPSec 56-bit (Plus IPSec 56) data encryption feature sets.



Caution

Cisco IOS images with strong encryption (including, but not limited to 168-bit (3DES) data encryption feature sets) are subject to United States government export controls and have limited distribution. Strong encryption images to be installed outside the United States may require an export license. Customer orders may be denied or subject to delay due to United States government regulations. When applicable, the purchaser or the user must obtain local import and use authorizations for all encryption strengths. Contact your sales representative or distributor for more information, or send an e-mail to export@cisco.com.

Table 6 and Table 7 list the features and feature sets supported by the Cisco 801–804 routers in Cisco IOS Release 12.0(7)XV. Both tables use the following conventions:

- Yes—The feature is supported in the software image.
- No—The feature is not supported in the software image.
- In (column)—indicates the Cisco IOS release when the image was first introduced. For example, (5)T means an image was introduced in Release 12.0(5)T. If a cell in this column is empty, the interface was included in the initial base release.



Note

This feature set table only contains a selected list of features. This table is not cumulative—nor does it list all the features in each image.

Table 6 Feature List by Feature Set for the Cisco 801–804 Routers

Features	Feature Set							
	In	IP	IP Plus	IP/IPX Plus	IP/FW	IP/FW Plus	IP/FW/Plus/ IPSEC56 (VPN)	IP/IPX/FW/ IPSEC56/ Plus
Address Conservation								
PAT (NAT Overload)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
NAT		Yes	Yes	Yes	Yes	Yes	Yes	Yes
NAT with H.323		No	No	No	No	No	No	No
Advanced Telephone Features¹								
Call Forward (Sweden and Finland only)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Call Forward Variable (North America only)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Call Hold Retrieve (North America only)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Call Transfer (North America only)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Call Waiting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Caller ID (North America only)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data-Over-Voice Bearer (North America only)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distinctive Ringing		Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN-Voice Priority		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Basic Services								
GRE Tunneling		No	Yes	Yes	No	Yes	Yes	Yes
NAT		Yes	Yes	Yes	Yes	Yes	Yes	Yes
PAP, CHAP, MSCHAP, Local Password		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ease of Use and Deployment								
Auto SPID / Switch Detection	(3)T	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cisco ConfigMaker		Yes	Yes	Yes ²	Yes	Yes	Yes	Yes
Cisco FastStep		Yes	Yes	Yes ²	Yes	Yes	Yes	Yes
Configuration Express		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Easy IP Phase I and II (IPCP Address Negotiation and DHCP Server)	(3)T	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TFTP Client and Server		Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAN								
AppleTalk		No	No	No	No	No	No	No
IP		Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPX		No	No	Yes	No	No	No	Yes

Table 6 Feature List by Feature Set for the Cisco 801–804 Routers (continued)

Features	Feature Set							
	In	IP	IP Plus	IP/IPX Plus	IP/FW	IP/FW Plus	IP/FW/Plus/ IPSEC56 (VPN)	IP/IPX/FW/ IPSEC56/ Plus
NetBIOS Access Lists		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Transparent Bridging		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Management								
Cisco View		Yes	Yes	Yes	Yes	Yes	Yes	Yes
SNMP, Telnet, Console Port		Yes	Yes	Yes	Yes	Yes	Yes	Yes
SNTP		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Syslog		No	Yes	Yes	No	Yes	Yes	Yes
Routing								
BGP		No	No	No	No	No	No	No
EGP		No	No	No	No	No	No	No
IGRP		No	No	No	No	No	No	No
IP Enhanced IGRP		No	Yes	Yes	No	Yes	Yes	Yes
IP Multicast (relay only)		No	Yes	Yes	No	Yes	Yes	Yes
IP-Policy Routing		No	Yes	Yes	No	Yes	Yes	Yes
IPXWAN		No	No	Yes	No	No	No	Yes
OSPF		No	No	No	No	No	No	No
RIP, RIPv2, Triggered RIP		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Security								
AAA Radius		No	No	No	No	No	No	No
AAA TACACS+		No	No	No	No	No	No	No
Additional Vendor-Proprietary RADIUS Attributes		No	No	No	No	No	No	No
Authenticating ACL		No	No	No	No	No	No	No
Automated Double Authentication (server functionality)		No	No	No	No	No	No	No
Certificate Authority Interoperability ³		No	No	No	No	No	No	No
Internet Key Exchange Security Protocol		No	No	No	No	No	No	No
IPSec Network Security	(5)T	No	No	No	No	No	Yes	Yes

Table 6 Feature List by Feature Set for the Cisco 801–804 Routers (continued)

Features	Feature Set							
	In	IP	IP Plus	IP/IPX Plus	IP/FW	IP/FW Plus	IP/FW/Plus/ IPSEC56 (VPN)	IP/IPX/FW/ IPSEC56/ Plus
IOS Firewall Phase I								
– Context Based Access Control Lists		No	No	No	Yes	Yes	Yes	Yes
– Java Blocking		No	No	No	Yes	Yes	Yes	Yes
– Denial of Service Detection and Prevention		No	No	No	Yes	Yes	Yes	Yes
– Real-time Alerts and Audit Trails		No	No	No	Yes	Yes	Yes	Yes
IPSec Encryption with 56 bit DES		No	No	No	No	No	Yes	Yes
Lock and Key		Yes	Yes	Yes	Yes	Yes	Yes	Yes
LT2P		No	No	No	No	No	Yes	Yes
Named Method Lists for AAA Authentication & Accounting		No	No	No	No	No	No	No
Route and Router Authentication		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Token Card - Double Authentication		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Voice Technologies								
Called Party Number Port	(5)T	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WAN								
Frame Relay Encapsulation (for ISDN LL)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN Digital Subscriber Line (IDSL)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frame Relay Inverse ARP		No	No	No	No	No	No	No
ISDN		Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN Leased Line (up to 144 kbps)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
ML-PPP, PPP Compression		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mobile IP		No	No	No	No	No	No	No
PPP over Frame Relay (RFC 1973)		No	No	No	No	No	No	No
(Remote) Common Application Programming Interface (CAPI & RAPI) ⁴	(7)XV	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WAN Optimization								
Always On/Dynamic ISDN (AO/DI)		No	Yes	Yes	No	Yes	Yes	Yes
Bandwidth on Demand (BOD)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dial on Demand (DDR)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
HRSP		No	No	No	No	No	No	No

Table 6 Feature List by Feature Set for the Cisco 801–804 Routers (continued)

Features	Feature Set							
	In	IP	IP Plus	IP/IPX Plus	IP/FW	IP/FW Plus	IP/FW/Plus/ IPSEC56 (VPN)	IP/IPX/FW/ IPSEC56/ Plus
IPX and SPX Spoofing		No	No	Yes	No	No	No	Yes
ISDN Caller ID Callback		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Snapshot Routing		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stac Compression		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-based Access Lists	(3)T	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.25 ID		No	Yes	Yes	No	Yes	Yes	Yes

1. Advanced Telephone Features are available on the Cisco 803 and 804 routers only. These features require supplementary services from a telephone company.
2. The X.25 configuration feature requires the use of the Cisco command line interface (CLI).
3. Interoperability with Certification Authority servers from VeriSign is not supported for IPsec in Release 12.0(5)T and earlier releases on Cisco 800 series routers.
4. The CAPI and RAPI feature is part of the base software image, therefore it is included in all images.

The Cisco 800 series routers also support the features listed in Table 7.

Table 7 Additional Features supported by Cisco 800 Routers

Feature	IP	IP Plus	IP/IPX Plus	IP/FW	IP/FW Plus	IP/FW/Plus/ IPSec	IP/FW/Plus/ IPSec Plus
Routed Protocol	IP	IP	IP/IPX	IP	IP	IP	IP/IPX
Routing Protocol	RIP Snapshot	RIP/IP- EIGRP Snapshot	RIP/IP- EIGRP/ IPX WAN Snapshot	RIP/IP- EIGRP Snapshot	RIP/IP- EIGRP Snapshot	RIP/IP- EIGRP Snapshot	RIP/IP- EIGRP/ IPX WAN Snapshot
Tunneling		GRE	GRE		GRE	GRE	GRE
X.25		X.25	X.25		X.25	X.25	X.25
SNTP (Simple Network Time Protocol)	SNTP	SNTP	SNTP	SNTP	SNTP	SNTP	SNTP
Multicast		IP Multicast Forwarding	IP Multicast Forwarding		IP Multicast Forwarding	IP Multicast Forwarding	IP Multicast Forwarding
Management	SNMP	SNMP/ SYSLOG	SNMP/ SYSLOG	SNMP	SNMP/ SYSLOG	SNMP/ SYSLOG	SNMP/ SYSLOG
Manual ISDN Calls (see reference for commands)	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Installation Notes

This section describes the following topics:

- Image Installation Tips and Troubleshooting When Using The RSL, page 11
- Alternatives to the RSL, page 12
- Common Application Programming Interface, page 15

Image Installation Tips and Troubleshooting When Using The RSL

Image Installation Tips

The following information about RSL operations can help you with the installation process:

- If you are loading software on a preconfigured Cisco 800 series router, save the router configuration file on your PC before running the RSL.
- If you have added any static entries to the PC Address Resolution Protocol (ARP) table, one or more of them may be deleted by the RSL. Manually re-enter any deleted entries in the PC ARP table.
- During a connection, if the Cisco 800 series router running configuration is not the same as its startup configuration, the exact configuration is not restored. Any changes that you made since the last time you entered **copy running-config startup-config** or **write memory** commands are lost.
- The RSL restores the Cisco 800 series router startup configuration, but some running configuration commands are not restored. To restore the exact running configuration, reboot the router. The following interface configuration commands are not restored to the running configuration:
 - **no shutdown**
 - **no ringspeed**
 - **media-type aui**

Recovering from a Connection Error

If any of the following elements apply to your installation, modify the Short Timeout value from the Options dialog box in the RSL:

- You are connecting to a router or access server that has a large configuration file.
- You are connecting to a Cisco AS5200 access server.
- You see the following error message:
"Failed to configure the router to enable the Cisco IOS software image and configuration file upload and download operations. You may want to check the router to make sure that the selected interface exists."

If you are connecting to a Cisco AS5200, increase the Short Timeout value to 60 seconds. The Cisco AS5200 requires up to 45 seconds to write a configuration to nonvolatile random-access memory (NVRAM) due to the number of interfaces the it must check during this process.

If you are connecting to any other router or access server, increase the Short Timeout to a value over 25 seconds.

**Note**

If you change the timeout value, you must do so before connecting to the Cisco 800 series router, or the new value will not be used. Also, increasing the Short Timeout value can increase the time it takes for the RSL to connect to the target Cisco 800 series router.

Restoring the Startup Configuration

In some cases, the RSL is unable to restore the startup configuration. If this happens, follow these steps:

- Step 1** Ensure that all cables are properly attached to both the Cisco 800 series router and the PC.
- Step 2** Restart the RSL and connect by using the **Preconfigured router** option.
- Step 3** When asked if you want to overwrite the existing startup configuration file, choose **no**.
- Step 4** When asked if you want to continue, choose **yes**.
- Step 5** When the Cisco 800 series router is connected, select **Download Router Configuration** in the Router Software Loader dialog box.
- Step 6** Select the appropriate file and click the radio button beside **Copy configuration to the router nonvolatile memory**. The Cisco 800 series router should now contain the startup configuration it had before the initial RSL connection.
- Step 7** Exit the RSL.

**Note**

In the steps above, the Cisco 800 series router configuration register (**config-register 0xnnnn**) is not restored.

**Note**

If you press **Ctrl-Alt-Delete** to quit the RSL, the router configuration and the configuration register are not restored. However, the configuration file is not deleted from the PC. To restore the configuration file, follow the steps above, beginning with Step 2.

Alternatives to the RSL

The RSL is designed to work with a PC running Microsoft Windows 95 and is the recommended method for downloading software to the router; however, two alternatives are available for installing router software:

- Installing the Router Software by Using the Console
- Installing the Router Software by Using a TFTP Server Application

**Note**

The sample prompts and output shown in the following sections may not be identical to the prompts displayed on the Cisco 800 series router console.

Installing the Router Software by Using the Console

This section explains how to use the **copy xmodem flash** command to install the router software from the CD-ROM onto the router.

The following example shows how to use the **copy xmodem flash** command on a Cisco 800 series router:

```
Router# copy xmodem flash
**** WARNING ****
x/modem is a slow transfer protocol limited to the current speed
settings of the auxiliary/console ports. The use of the auxiliary
port for this download is strongly recommended.
During the course of the download no exec input/output will be
available.
----
Proceed? [confirm] yes
Use crc block checksumming? [confirm] yes
Max Retry Count [10]:
Perform image validation checks? [confirm] yes
Xmodem download using crc checksumming with image validation
Continue? [confirm] yes
Partition      Size      Used      Free      Bank-Size  State      Copy Mode
1             4096K    3259K     836K     4096K     Read/Write Direct
2             4096K      0K     4095K     4096K     Read/Write Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 1] 2

System flash directory, partition 2:
File Length Name/status
1    68 TESTFILE
[132 bytes used, 4194172 available, 4194304 total]
Destination file name? c800-nsy6-mw.12.0-7xv
Erase flash device before writing? [confirm] yes
Flash contains files. Are you sure you want to erase? [confirm] yes

Copy '' from server
as 'c800-nsy6-mw.12.0-7xv' into Flash WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeeeeee ...erased
Ready to receive file.....C
Verifying checksum... OK (0x5DE8)
Flash device copy took 00:12:06 [hh:mm:ss]
```

Installing the Router Software by Using a TFTP Server Application

Use this TFTP server application method as an alternative method to install the router software from the CD-ROM. You can perform this procedure by using a PC (running Microsoft Windows 95 or Microsoft Windows 3.1), a Macintosh, or a UNIX system. You can use either the **copy tftp flash** or **copy rcp flash** command to download the router software to the router.

First, obtain a TFTP application or a remote copy protocol (rcp) application to set up your computer as a TFTP server or an rcp server. If you are using a PC running Windows 95, you can use the RSL or the TFTP server included on the feature pack CD-ROM to install the router software. For other operating systems, a number of TFTP or rcp applications are available from independent software vendors or as shareware on the World Wide Web.



Note

To use an rcp application, follow the same procedure below, but substitute “rcp” for “TFTP” and use the **copy rcp flash** command instead of the **copy tftp flash** command.

- Step 1** Install any TFTP server application on the PC. (A PC application is included on the feature pack CD-ROM for Microsoft Windows 95 only.)
- Step 2** Start the TFTP server application on the PC by double-clicking the application icon or its .exe filename.
- Step 3** Set up the PC as a TFTP server by using the TFTP server application setup or configuration facility. Most TFTP server applications include a setup facility that allows you to specify the PC as a server. For example, from the TFTP menu of one application, select **Settings** to display a panel. To configure the local PC as a server, select the Server checkbox.
- Select a root directory where the Cisco IOS files reside (for example, d:\cpswinst\images).



Caution Make sure you set up your local PC as a TFTP server. If you do not, you cannot perform the copy procedure. This caution applies to both TFTP and rcp.

- Step 4** Establish a console session from your local PC (which is now configured as a TFTP server) to the Cisco router by using one of these methods:
- Connect the PC com port to the Cisco 800 series router console port.
This is the recommended method. When you reload the Cisco 800 series router with the new image in Step 10, you remain connected to the Cisco 800 series router.
 - Establish a Telnet session from the PC to the Cisco 800 series router. If you choose to use Telnet, your connection to the Cisco 800 series router will be lost when it is reloaded.



Caution Make sure that your PC is set up to communicate with the connected device through its network port.

- Step 5** Connect your PC's LAN port to the corresponding LAN port on the Cisco 800 series router. If you are making a direct connection to the Cisco 800 series router via Ethernet or Fast Ethernet, use an Ethernet crossover cable. If connecting to the Cisco 800 series router via an Ethernet or Fast Ethernet hub or Token Ring MAU (hub), use straight-through cable.



Note We recommend that you back up the router configuration before upgrading the router software.

- Step 6** At the prompt, enter the IP address of your PC, as shown in the following example:
Address or name of remote host [255.255.255.255]? **131.108.1.1**
This is the IP address of your local PC, not that of the router.
- Step 7** At the prompt, enter the filename of the Cisco IOS Release 12.0(7)XV image to be copied to the router, as shown in the following example:
Source file name? **aaa1167.bin**
- This example specifies the DOS image name of the IP feature set for Cisco 800 series routers (as shown in Table 4 in the "Cisco 800 Series Routers Feature Packs" section on page 5).
- Step 8** At the prompt, enter the destination UNIX image filename and press **Enter**.

This is the name of the image file on the router—not the full pathname of the image on the CD-ROM attached to the PC. Refer to Table 4 in the “Cisco 800 Series Routers Feature Packs” section on page 5 for the UNIX image filename.

Destination file name [aaa1167.bin.bin]? **c800-nsy6-1**

During the transfer process, the software displays messages indicating that it has accessed the file you have specified and is loading it.

- Step 9** At the prompt, enter **yes** if you want to erase the existing image copy resident in the router Flash memory before copying the new one.

Erase flash device before writing? [confirm] **yes**

The entire copying process takes several minutes and differs from network to network.

The exclamation point (!) indicates that the copy process is taking place. Each exclamation point (!) indicates that ten packets have been transferred successfully. A checksum verification of the image occurs after the image is written to Flash memory.

- Step 10** Enter the **reload** command to reload the router:

Router# **reload**

After the reload is complete, the router should be running the required Cisco IOS image. Use the **show version** command to verify it.

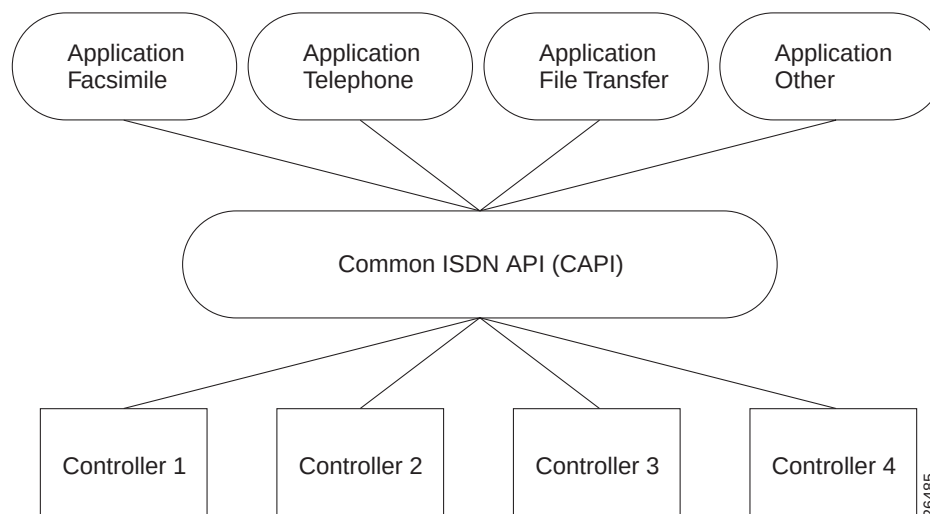
Common Application Programming Interface

The Common Application Programming Interface (CAPI) is an application programming interface standard used to access ISDN equipment connected to Basic Rate Interfaces (BRIs) and Primary Rate Interfaces (PRIs). Remote Common Application Programming Interface (RCAPI) is the CAPI feature configured remotely from a PC client. CAPI provides the following features:

- A standardized interface through which application programs use ISDN drivers and controllers. One application can use one or more controllers. Several applications can share one or more controllers.
- A selection mechanism that supports applications that use protocols at different levels and standardized network access. To provide this support, an abstraction from different protocol variables is performed. All connection-related data, such as connection state and display messages, is available to the applications at any time.

Figure 1 shows how CAPI connects applications, drivers, and controllers.

Figure 1 CAPI Connections



The framing protocols supported by CAPI include High-Level Data Link Control (HDLC), HDLC inverted, bit transparent (speech), and V.110 synchronous/asynchronous. CAPI integrates the following data link and network layer protocols:

- Link Access Procedure on the D-channel (LAPD) in accordance with Q.921 for X.25 D-channel implementation
- Point-to-Point Protocol (PPP)
- ISO 8208 (X.25 DTE-DTE)
- X.25 DCE, T.90NL, and T.30 (fax group 3)

CAPI Features

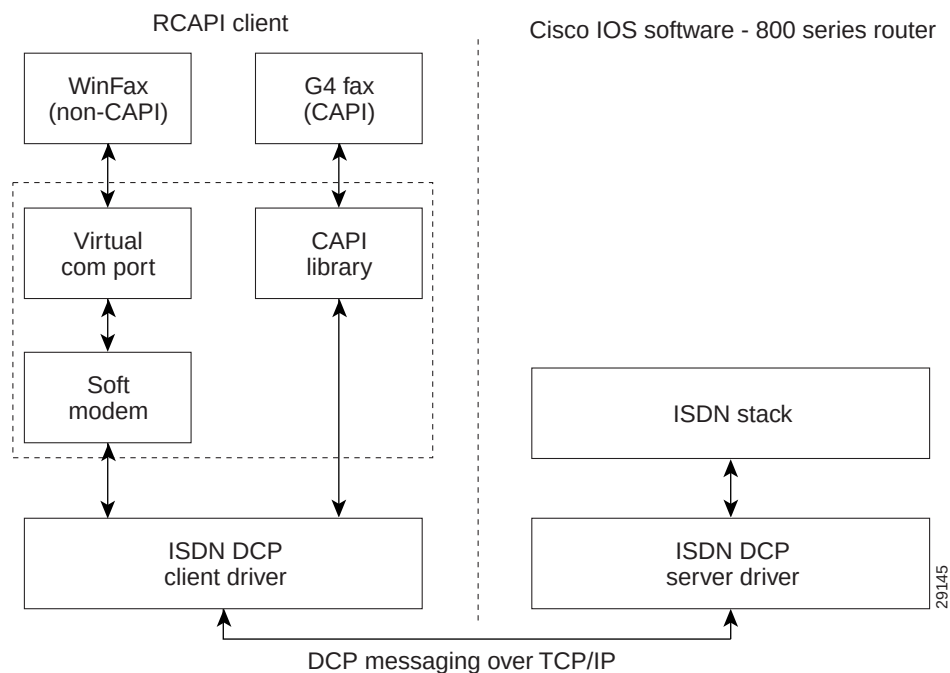
CAPI supports the following features:

- Basic call features, such as call setup and tear-down
- Multiple B channels for data and voice connections
- Multiple logical data link connections within a physical connection
- Selection of different services and protocols during connection setup and on answering incoming calls
- Transparent interface for protocols above Layer 3
- One or more BRIs as well as PRI on one or more Integrated Services Digital Network (ISDN) adapters
- Multiple applications
- Operating-systems-independent messages
- Operating-system-dependent exchange mechanism for optimum operating system integration
- Asynchronous event-driven mechanism, resulting in high throughput

- Well-defined mechanism for manufacturer-specific extensions
- Multiple supplementary services

Figure 2 shows the components of the RAPI implementation.

Figure 2 *Components of RAPI*



CAPI and RVS-COM

The router supports the ISDN Device Control Protocol (ISDN-DCP) from RVS-COM. ISDN-DCP allows a workstation on the LAN or router to use legacy dial computer telephony integration (CTI) applications. These applications include placing and receiving telephone calls and transmitting and receiving faxes.

Using ISDN-DCP, the router acts as a DCP server. By default, the router listens for DCP messages on TCP port number 2578 (the Internet-assigned number for RVS-COM DCP) on its LAN port.

When the router receives a DCP message from a DCP client (connected to the LAN port of the router), the router processes the message and acts on it; it can send confirmations to the DCP clients and ISDN packets through the BRI port of the router. When the router receives packets destined for one of the DCP clients on its BRI port, the router formats the packet as a DCP message and sends it to the corresponding client. The router supports all the DCP messages specified in the ISDN-DCP specifications defined by RVS-COM.

Supported B-Channel Protocols

The router provides two 64-kbps B channels to CAPI clients. Each B channel can be configured separately to work in either HDLC mode or bit transparent mode. For CAPI support, layers B2 through B7 protocols are transparent to the applications using these B channels.

The ISDN Core Engine of RVS-COM supports the following B-channel protocols:

- CAPI layer B1
 - 64 kbps with HDLC framing
 - 64-kbps bit transparent operation with byte framing from the network
 - T.30 modem for fax group 3
 - Modem with full negotiation
- CAPI layer B2
 - V.120
 - Transparent
 - T.30 modem for fax group 3
 - Modem with full negotiation
- CAPI layer B3
 - Transparent
 - T.90NL with compatibility to T.70NL according to T.90 Appendix II
 - ISO 8208 (X.25 DTE-DTE) modulo 8 and windows size 2, no multiple logical connections
 - T.30 for fax group 3
 - Modem with full negotiation
- T.30 for fax group 3 (SFF file format [default], sending and receiving up to 14400 bit/s with ECM option, modulations V.17, V.21, V.27ter, V.29)
- Analog modem (sending and receiving up to 14,400 bit/s, modulations V.21, V.22, V.22bis, V.23, V.32, V.32bis)

Supported D-Channel Protocols

CAPI support is available only for the ISDN switch type Net3.

Supported Applications

ISDN-DCP supports CAPI and non-CAPI applications. Applications are supported that use one or two B channels for data transfer, different HDLC-based protocols, Euro File transfer, or G4 fax; also supported are applications that send bit-transparent data such as A/Mu law audio, G3 fax, analog modem, or analog telephones.

Requirements

Before you can enable the RAPI feature on the Cisco 800 series router, the following requirements must be met:

- Cisco 800 series software with RAPI support is installed on the router.
- CAPI commands are properly configured on the router.
- Both the CAPI local device console and RAPI client devices on the LAN are correctly installed and configured with RVS-COM client driver software.

Configuring the 800 Series Router

The following procedure provides step-by-step instructions for configuring RAPI on the 800 series router:

-
- Step 1** At the local device console, change to global configuration mode.
- ```
router# configure terminal
router(config)#
```
- Step 2** Set the switch type. In the following example, the switch type is set to ETSI.
- ```
router(config)# isdn switch-type basic-net3
```
- Step 3** Enter the RAPI directory number assigned by the ISDN provider for the device. For example:
- ```
router(config)# rcapi number 12345
```
- Step 4** Optional. Perform this step only if you wish to specify a port number for RAPI functions. Otherwise, the default port 2578 is used. Configure the same number on both the router and client PC. For example:
- ```
router(config)# rcapi server port 2000
```
- Step 5** Exit from global configuration mode to interface configuration mode.
- ```
router(config)# int bri0
```
- Step 6** Set the switch type for the bri0 interface. In the following example, the switch type is set to ETSI.
- ```
router(config-if)# isdn switch-type basic-net3
```
- Step 7** Set the modem as the default handler for incoming voice calls.
- ```
router(config-if)# isdn incoming-voice modem
```
- Step 8** Change to privileged EXEC mode either by pressing **Ctrl-Z** or by entering **exit** twice, once at the interface mode prompt and again at the global configuration mode prompt.
- ```
router(config-if)# exit  
router(config)# exit  
router#
```
- Step 9** Optional. Enter the following if you wish to display RAPI status.
- ```
router# show rcapi status
```
- Step 10** Optional. In privileged EXEC mode, start the debug program to run in the background.
- ```
router# debug rcapi events
```
- Step 11** If required, at each remote device console, change to global configuration mode. Repeat Step 2 through Step 10 to configure that device.
-

RCAPI Router Commands

This section describes in detail the Cisco IOS commands for configuring RCAPi on the 800 series routers. These commands are applicable only for ISDN Net3 switch types.

- **rcapi number**
- **rcapi server**
- **show rcapi status**
- **debug rcapi events**

rcapi number

To enable the Cisco 800 series router to distinguish between incoming CAPI calls and incoming non-CAPI calls such as POTS, PPP, and X.25, use the **rcapi number** command. This command allows the Cisco 800 series router to reserve directory numbers exclusively for incoming calls.

rcapi number *directory number*[:*subaddress*]

no rcapi number *directory number*[:*subaddress*]

The **no rcapi number** *directory number*[:*subaddress*] command releases the specified directory number from the RCAPi interface. By default, no directory number is set for the RCAPi interface.

Syntax Description

The *directory number* is the number assigned by the ISDN provider for the PC on which RCAPi is configured. This number should not be set to any other interface.

Command Elements	Description
number <i>directory number</i>	ISDN directory number. Default is <i>none</i> .
[: <i>subaddress</i>]	Optional subaddress of router preceded by a colon (:).

Defaults

The default is no directory number is set for the RCAPi interface.

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS Release 12.0(7)XV	The commands rcapi number and no rcapi number were introduced on the Cisco 800 series router.

Usage Guidelines

The directory number should not be set to any other interfaces such as POTS and DOV. This command works only with the Net3 switch type.

Examples

Enter the global configuration mode before configuring the RAPI number.

```
router(config)# rcapi number 12345
```

Related Commands

Command	Description
rcapi number	Enables RAPI on the 800 series router.
show rcapi status	Displays the status of RAPI and, if enabled, the details of the application.
debug rcapi events	Displays diagnostic DCP and driver messages.

rcapi server

To enable the RAPI server on the 800 series router or to set the TCP port number, use the **rcapi server** global configuration command.

rcapi server [*port number*]

no rcapi server

The **no rcapi server** command disables the RAPI server on the 800 series router.

Syntax Description

Command Elements	Description
[<i>port number</i>]	TCP port number. Default is 2578.

Defaults

If the router is configured for basic Net3 IDSN switch type, by default RAPI is enabled, and the port number is set to 2578.

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS Release 12.0(7)XV	The commands rcapi server and no rcapi server were introduced on the Cisco 800 series router.

Usage Guidelines

This command works only with the Net3 switch type.

Examples

Enter the global configuration mode before configuring the RCAPi port number:

```
router(config)# rcapi server port 2000
```

Related Commands

Command	Description
rcapi number	Sets the directory number and the subaddress of the router.
show rcapi status	Displays the status of RCAPi and, if enabled, the details of the application.
debug rcapi events	Displays diagnostic DCP and driver messages.

show rcapi status

Use the **show rcapi** command to display:

- Whether RCAPi is turned on or off.
- If RCAPi is running, details about the list of CAPI clients currently registered, the type of application that each client is running, and the status of each CAPI call at the time of the display.

Syntax Description

This command contains no arguments or keywords.

Command Modes

Privileged EXEC.

Command History

Release	Modification
Cisco IOS Release 12.0(7)XV	The command show rcapi status was introduced on the Cisco 800 series router.

Usage Guidelines

This command works only with the Net3 switch type.

Examples

The following is an example of the output from the **show rcapi status** command.

```
router# show rcapi status

RCAPI SERVER ON
RCAPI SERVER PORT 2578
RCAPI NUMBER 5553000 5553100
```

CLIENT	SESSION ID	LISTEN	CONNECTION ID	TYPE	CALL STATUS
912.168.100.3	16777212	ON			
192.168.100.5	16777218	OFF	50333953	Bit Transparent	Connected
192.168.100.6	16777227	OFF	50333962	HDLC	Connected

Related Commands

Command	Description
rcapi number	Sets the directory number and the subaddress of the router.
rcapi server	Enables RAPI on the 800 series router.
debug rcapi events	Displays diagnostic DCP and driver messages.

debug rcapi events

To display diagnostic DCP and driver messages to help in troubleshooting, use the **debug rcapi events** command.

debug rcapi events

no debug rcapi events

The **no debug rcapi events** command disables debugging.

Syntax Description

This command contains no arguments or keywords.

Defaults

By default, debugging is set to *off*.

Command Modes

Privileged EXEC.

Command History

Release	Modification
Cisco IOS Release 12.0(7)XV	The command debug rcapi events was introduced on the Cisco 800 series router.

Usage Guidelines

This command works for all switch types.

Related Commands

Command	Description
rcapi number	Sets the directory number and the subaddress of the router.
rcapi server	Enables RCAPI on the 800 series router.
show rcapi status	Displays the status of RCAPI and, if enabled, the details of the application.

The RCAPI feature configuration information is also available online on CCO and the Documentation CD-ROM. See the online Feature Module document *Configuring the (Remote) Common Application Programming Interface for Cisco 800 Series Routers*.

Related Documentation

The following sections describe the documentation available for the Cisco 800 series. These documents consist of hardware and software installation guides, Cisco IOS configuration and command references, system error messages, feature modules, and other documents.

Documentation is available as printed manuals or electronic documents, except for feature modules, which are available online on CCO and the Documentation CD-ROM.

Use these release notes with these documents:

- Release-Specific Documents, page 24
- Platform-Specific Documents, page 25
- Feature Modules, page 26
- Cisco IOS Software Documentation Set, page 26

Release-Specific Documents

The following documents are specific to Release 12.0 and are located on CCO and the Documentation CD-ROM:

- *Cross-Platform Release Notes for Cisco IOS Release 12.0*

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Release Notes: Cross-Platform Release Notes

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Release Notes: Cross-Platform Release Notes

- Product bulletins, field notices, and other release-specific documents on CCO at:

Service & Support: Technical Documents

- *Caveats for Cisco IOS Release 12.0 T*

This document contains caveats applicable to all platforms for all maintenance releases of Release 12.0 T.

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Caveats

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Caveats



Note

If you have an account with CCO, you can use Bug Navigator II to find caveats of any severity for any release. You can reach Bug Navigator II on CCO at **Software Center: Cisco IOS Software: BUG TOOLKIT: Cisco Bug Navigator II**, or at <http://www.cisco.com/support/bugtools/bugtool.shtml>.

Platform-Specific Documents

These documents are available for the Cisco 800 series on CCO and the Documentation CD-ROM:

- *Cisco 800 Series Router Quick Start Guide*
- *Cisco 800 Series Routers Hardware Installation Guide*
- *Cisco 800 Series Routers Software Configuration Guide*
- Release Notes for Cisco 800 Series Routers
- *Configuring Cisco IOS Software Features*
- *Cisco 800 Fast Step Quick Start Guide*
- *Cisco Fast Step documentation for the 800 series routes*
- *Regulatory Compliance and Safety Information*
- *Upgrading Memory in the Cisco 800 Series Routers*

On CCO at:

Technical Documents: Documentation Home Page: Access Servers and Access Routers: Fixed Access Routers: Cisco 801–804 Routers

On the Documentation CD-ROM at:

Cisco Product Documentation: Access Servers and Access Routers: Fixed Access Routers: Cisco 801–804 Routers

Feature Modules

Feature modules describe new features supported by Release 12.0 XV and are updates to the Cisco IOS documentation set. A feature module consists of a brief overview of the feature, benefits, configuration tasks, and a command reference. As updates, the feature modules are available online only. Feature module information is incorporated in the next printing of the Cisco IOS documentation set.

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: New Feature Documentation: New Features in 12.0-Based Limited Lifetime Releases: New Features in Release 12.0 XV: Configuring the RAPI for Cisco 800 Routers

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: New Feature Documentation: New Features in 12.0-Based Limited Lifetime Releases: New Features in Release 12.0 XV: Configuring the RAPI for Cisco 800 Routers

Cisco IOS Software Documentation Set

The Cisco IOS software documentation set consists of the Cisco IOS configuration guides, Cisco IOS command references, and several other supporting documents that are shipped with your order in electronic form on the Documentation CD-ROM—unless you specifically ordered the printed versions.

Documentation Modules

Each module in the Cisco IOS documentation set consists of two books: a configuration guide and a corresponding command reference. Chapters in a configuration guide describe protocols, configuration tasks, Cisco IOS software functionality, and contain comprehensive configuration examples. Chapters in a command reference provide complete command syntax information. Use each configuration guide with its corresponding command reference.

On CCO and the Documentation CD-ROM, two master hot-linked documents provide information for the Cisco IOS software documentation set.

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Configuration Guides and Command References

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Configuration Guides and Command References

Release 12.0 Documentation Set

Table 8 describes the contents of the Cisco IOS Release 12.0 software documentation set, which is available in electronic form and in printed form upon request.



Note

You can find the most current Cisco IOS documentation on CCO and the Documentation CD-ROM. These electronic documents may contain updates and modifications made after the hard-copy documents were printed.

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0

Table 8 Cisco IOS Software Release 12.0 Documentation Set

Books	Chapter Topics
<i>Configuration Fundamentals Configuration Guide</i> <i>Configuration Fundamentals Command Reference</i>	Configuration Fundamentals Overview Cisco IOS User Interfaces File Management System Management
<i>Bridging and IBM Networking Configuration Guide</i> <i>Bridging and IBM Networking Command Reference</i>	Transparent Bridging Source-Route Bridging Token Ring Inter-Switch Link Remote Source-Route Bridging DLSw+ STUN and BSTUN LLC2 and SDLC IBM Network Media Translation DSPU and SNA Service Point SNA Frame Relay Access Support APPN Cisco Database Connection NCIA Client/Server Topologies Cisco Mainframe Channel Connection Airline Product Set
<i>Dial Solutions Configuration Guide</i> <i>Dial Solutions Command Reference</i>	X.25 over ISDN Appletalk Remote Access Asynchronous Callback, DDR, PPP, SLIP Bandwidth Allocation Control Protocol ISDN Basic Rate Service ISDN Caller ID Callback PPP Callback for DDR Channelized E1 & T1 Dial Backup for Dialer Profiles Dial Backup Using Dialer Watch Dial Backup for Serial Lines Peer-to-Peer DDR with Dialer Profiles DialOut Dial-In Terminal Services Dial-on-Demand Routing (DDR) Dial Backup Dial-Out Modem Pooling Large-Scale Dial Solutions Cost-Control Solutions Virtual Private Dialup Networks Dial Business Solutions and Examples

Table 8 *Cisco IOS Software Release 12.0 Documentation Set (continued)*

Books	Chapter Topics
• <i>Cisco IOS Interface Configuration Guide</i> • <i>Cisco IOS Interface Command Reference</i>	Interface Configuration Overview LAN Interfaces Logical Interfaces Serial Interfaces
• <i>Network Protocols Configuration Guide, Part 1</i> • <i>Network Protocols Command Reference, Part 1</i>	IP Overview IP Addressing and Services IP Routing Protocols
• <i>Network Protocols Configuration Guide, Part 2</i> • <i>Network Protocols Command Reference, Part 2</i>	AppleTalk Novell IPX
• <i>Network Protocols Configuration Guide, Part 3</i> • <i>Network Protocols Command Reference, Part 3</i>	Network Protocols Overview Apollo Domain Banyan VINES DECnet ISO CLNS XNS
• <i>Security Configuration Guide</i> • <i>Security Command Reference</i>	AAA Security Services Security Server Protocols Traffic Filtering and Firewalls IP Security and Encryption Passwords and Privileges Neighbor Router Authentication IP Security Options
• <i>Cisco IOS Switching Services Configuration Guide</i> • <i>Cisco IOS Switching Services Command Reference</i>	Switching Services Switching Paths for IP Networks Virtual LAN (VLAN) Switching and Routing
• <i>Wide-Area Networking Configuration Guide</i> • <i>Wide-Area Networking Command Reference</i>	Wide-Area Network Overview ATM Frame Relay SMDS X.25 and LAPB
• <i>Voice, Video, and Home Applications Configuration Guide</i> • <i>Voice, Video, and Home Applications Command Reference</i>	Voice over IP Voice over Frame Relay Voice over ATM Voice over HDLC Frame Relay-ATM Internetworking Synchronized Clocks Video Support Universal Broadband Features

Table 8 Cisco IOS Software Release 12.0 Documentation Set (continued)

Books	Chapter Topics
• <i>Quality of Service Solutions Configuration Guide</i> • <i>Quality of Service Solutions Command Reference</i>	Policy-Based Routing QoS Policy Propagation via BGP Committed Access Rate Weighted Fair Queueing Custom Queueing Priority Queueing Weighted Random Early Detection Scheduling Signaling RSVP Packet Drop Frame Relay Traffic Shaping Link Fragmentation RTP Header Compression
• <i>Cisco IOS Software Command Summary</i> • <i>Dial Solutions Quick Configuration Guide</i> • <i>System Error Messages</i> • <i>Debug Command Reference</i>	

**Note**

Cisco Management Information Base (MIB) User Quick Reference is no longer published. For the latest list of MIBs supported by Cisco, see *Cisco Network Management Toolkit* on Cisco Connection Online. From CCO, click on the following path: **Service & Support: Software Center: Network Mgmt Products: Cisco Network Management Toolkit: Cisco MIB.**

Service and Support

For service and support for a product purchased from a reseller, contact the reseller, who offers a wide variety of Cisco service and support programs described in “Service and Support” of *Cisco Information Packet* that shipped with your product.

**Note**

If you purchased your product from a reseller, you can access CCO as a guest. CCO is Cisco Systems’ primary real-time support channel. Your reseller offers programs that include direct access to CCO services.

For service and support for a product purchased directly from Cisco, use CCO.

Software Configuration Tips on the Cisco Technical Assistance Center Home Page

If you have a CCO login account, you can access the following URL, which contains links and tips on configuring your Cisco products:

http://www.cisco.com/kobayashi/serv_tips.shtml

This URL is subject to change without notice. If it changes, point your Web browser to CCO and click on this path: **Products & Technologies: Products: Technical Tips**.

The following sections are provided from the Technical Tips page:

- Access Dial Cookbook—Contains common configurations or recipes for configuring various access routes and dial technologies.
- Field Notices—Notifies you of any critical issues regarding Cisco products and includes problem descriptions, safety or security issues, and hardware defects.
- Frequently Asked Questions—Describes the most frequently asked technical questions about Cisco hardware and software.
- Hardware—Provides technical tips related to specific hardware platforms.
- Hot Tips—Describes popular tips and hints gathered from the Cisco Technical Assistance Center (TAC). Most of these documents are available from the TAC Fax-on-demand service. To reach Fax-on-demand and receive documents at your fax machine from the United States, call 888-50-CISCO (888-502-4726). From other areas, call 650-596-4408.
- Internetworking Features—Lists tips on using Cisco IOS software features and services.
- Sample Configurations—Provides actual configuration examples that are complete with topology and annotations.
- Software Products—Contains Cisco IOS Software Bulletins, Cisco TCP/IP Suite 100, General Cisco IOS, Internet/Intranet Applications and Software, Network Management, Network Protection Software Tips, and WAN Switching Products and Software.
- Special Collections—Lists other helpful documents, including Case Studies, References & Request for Comments (RFCs), and Security Advisories.

Cisco Connection Online

Cisco Connection Online (CCO) is Cisco Systems' primary, real-time support channel. Maintenance customers and partners can self-register on CCO to obtain additional information and services.

Available 24 hours a day, 7 days a week, CCO provides a wealth of standard and value-added services to Cisco's customers and business partners. CCO services include product information, product documentation, software updates, release notes, technical tips, the Bug Navigator, configuration notes, brochures, descriptions of service offerings, and download access to public and authorized files.

CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously: a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, and Internet e-mail, and it is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can reach CCO in the following ways:

- WWW: <http://www.cisco.com>
- WWW: <http://www-europe.cisco.com>
- WWW: <http://www-china.cisco.com>
- Telnet: cco.cisco.com
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and connection rates up to 28.8 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.



Note

If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or tac@cisco.com. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which package that ships with your product. The Documentation CD-ROM, a member of the Cisco Connection Family, is updated monthly. Therefore, it might be more current than printed documentation. To order additional copies of the Documentation CD-ROM, contact your local sales representative or call customer service. The CD-ROM package is available as a single package or as an annual subscription. You can also access Cisco documentation on the World Wide Web at <http://www.cisco.com>, <http://www-china.cisco.com>, or <http://www-europe.cisco.com>.

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This document is to be used in conjunction with the documents listed in the "Related Documentation" section on page 24.

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